

State of Minnesota
Redwood County

District Court
Fifth Judicial District

Court File Number: **64-CR-08-820**

Case Type: Crim/Traf Mandatory

Notice of Filing of Order

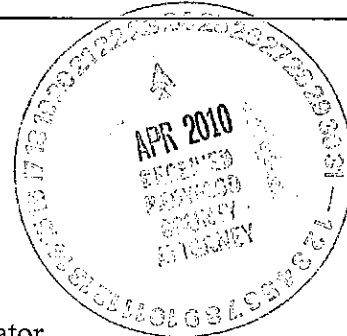
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State of Minnesota vs Lori A Matthys

You are notified that an order was filed on this date.

Dated: April 23, 2010

Patty Amberg
Court Administrator
Redwood County District Court
250 S Jefferson, PO Box 130
Redwood Falls MN 56283
507-637-4018



cc: DANIEL JOSEPH KOEWLER
JOAN M EICHHORST

COURT ADMINISTRATOR
REDWOOD COUNTY, MN
FILED

4-23-10

STATE OF MINNESOTA
COUNTY OF REDWOOD

IN DISTRICT COURT
FIFTH JUDICIAL DISTRICT

STATE OF MINNESOTA,

Plaintiff,

File No. 64-CR-08-820

vs.

LORI A. MATTHYS,

FINDINGS OF FACT,
CONCLUSIONS OF LAW,
AND ORDER

Defendant.

The above-entitled matter came before this Court on January 7 and 8, 2010, upon a Frye-Mack Hearing. Defendant was represented by Daniel J. Koewler and Charles A. Ramsay, Attorneys at Law, Roseville, Minnesota. The State appeared through Joan M. Eichhorst, Assistant Attorney General; Bill Lemons, Traffic Safety Resource Prosecutor; and Amy M. Busse, Assistant Redwood County Attorney.

At the hearing, the Court heard testimony from the following individuals:

Lower Sioux Police Officer Neil DeBlieck;
Dr. Edward Stern, Bureau of Criminal Apprehension Forensic Scientist;
Josef Yoch, Bureau of Criminal Apprehension Forensic Scientist;
Glenn Hardin, Hamline University Professor of Practice in the Forensic Sciences,
RSI Laboratories Scientific Director, The Tox Group, Inc. consultant; and
Thomas Burr, Forensic Scientist consultant.

The Court also received exhibits on file herein.

Based upon all the files and records herein, and upon the testimony adduced at said hearing, the Court makes the following:

FINDINGS OF FACT

The Traffic Stop and Collection of the Urine Sample

1. On August 23, 2008 at approximately 9:45 p.m., Officer DeBlieck was on patrol in Redwood County on County Road 2, just south of US Highway 71.
2. At that time, Officer DeBlieck saw a silver Dodge Caravan southbound on County Road 2.
3. Officer DeBlieck followed the Caravan and saw it cross the center line of the highway.
4. At the intersection of County Road 2 and County Road 24, the right-turn lane (to turn from southbound County Road 2 to westbound County Road 24) curves away from the

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- left lane and is separated from the left lane by a triangle-shaped area of pavement painted with diagonal lines, indicating that traffic is not to drive in that area.
5. The Caravan approached County Road 24 and remained in the left lane.
 6. Before reaching the stop sign at the intersection of County Road 2 and County Road 24, the Caravan abruptly turned right, cutting through the painted triangle-shaped area of pavement, and began traveling west on County Road 24.
 7. Officer DeBlieck continued following the Caravan, which then turned right at Omega Avenue.
 8. At that point, Officer DeBlieck initiated a traffic stop.
 9. Officer DeBlieck approached the Caravan and identified the driver via Minnesota Driver's License; that driver was Defendant.
 10. While speaking with Defendant, Officer DeBlieck noticed an odor of alcohol, saw that Defendant's eyes were bloodshot and watery, and noticed that Defendant fumbled for documents; based upon his training and experience, Officer DeBlieck believed his observations indicated that Defendant was possibly impaired.
 11. Officer DeBlieck asked Defendant if she had consumed any alcohol, and Defendant admitted consuming two drinks earlier in the evening.
 12. After returning to his squad to run a check on Defendant's record via dispatch, Officer DeBlieck re-approached the Caravan and administered field sobriety tests to Defendant.
 13. During the horizontal gaze and nystagmus test, Officer DeBlieck observed a distinct nystagmus in both eyes at maximum deviation and a lack of smooth pursuit in both eyes.
 14. During the one-legged stand test, Defendant held her foot off the ground for only three seconds; Officer DeBlieck explained the testing procedure again, however, when Defendant tried again, she again put her foot down after only three seconds; Officer DeBlieck explained the test a third time, however, again Defendant put her foot down after only three seconds.
 15. During the walk and turn test, Defendant stepped off of a straight line, failed to step heel to toe, and took the wrong number of steps.
 16. Officer DeBlieck administered a preliminary breath test ("PBT") which indicated a result of 0.147.
 17. Based upon his training and experience, Officer DeBlieck believed that that Defendant was under the influence of alcohol and, therefore, arrested Defendant for violation of the DWI laws.
 18. Officer DeBlieck transported Defendant to the Law Enforcement Center, where he then invoked the Implied Consent Advisory.
 19. Defendant did not invoke her right to consult with an attorney, and Defendant agreed to submit to a urine test.
 20. The parties have stipulated that Defendant did not void her bladder during the time between the traffic stop and providing the urine sample.
 21. A female jailor or dispatcher on duty collected the urine sample from Defendant, and the parties have stipulated that the procedures of Minnesota Rule 7502.0700 were followed.
 22. Officer DeBlieck then mailed the collected sample to the Minnesota Bureau of Criminal Apprehension ("BCA") for analysis.
 23. The parties have stipulated that there was no violation of the chain of custody after the sample was submitted.

24. The BCA reported the alcohol concentration of the urine sample as 0.13 grams per 67 milliliters of urine.

Urine Collection Kits

25. The BCA supplies local law enforcement agencies with collection kits to obtain urine samples.
26. A subject's urine is collected in a plastic bottle that has a plastic screw cap.
27. The bottle contains one gram of sodium fluoride, which acts as a preservative to prevent any changes that could be caused if an outside organism got into the urine, and its use for that purpose is generally accepted in the scientific community.
28. The BCA receives information about the quality control mechanisms the kit manufacturer uses.
29. The BCA also performs acceptance testing before the BCA will accept a lot; this acceptance testing consists of inspecting a portion (roughly one percent or fewer) of the kits in a lot; that testing includes visual inspection to make sure all the components are in the kit and testing of the amount of sodium fluoride in the bottle.
30. While the BCA prefers that its kits be used, the BCA will accept and test urine samples that arrive in other kits.
31. When the BCA begins processing a urine kit for testing, the analyst will check that the identification numbers on the kit match the numbers in the case file; the analyst ensures that there is no apparent damage to the kit; the analyst will inspect the specimen itself and check the volume of urine in the bottle.
32. When not being tested or being set up for testing, the urine samples are stored in a refrigerator.
33. In this specific case, Mr. Yoch analyzed Defendant's urine sample.
34. Defendant's urine sample was received in a BCA urine collection kit, and all of the proper procedures for checking the kit were followed.
35. In Mr. Yoch's inspection of Defendant's sample, he noted that there was about 20 milliliters of urine, which was clear and had no apparent odor coming from it.
36. The BCA procedures regarding the urine collection kits are appropriate standards and controls, and those standards and controls were followed in this case.

Headspace Gas Chromatography

37. When the BCA laboratory receives a urine sample for testing, a portion of the urine is placed into a "headspace" vial; the urine is then diluted with a "reference standard" or "internal standard" solution and a rubber septum is placed on top of the vial, which creates an airtight seal.
38. Once the vial is sealed, certain substances, such as ethyl alcohol and the standard solution, vaporize into gas, which remains trapped inside the vial.
39. Over time (approximately 12 minutes), the air inside the vial "equilibrates" with the liquid inside the vial, such that the proportion of the vaporizing substances in the air and in the liquid is at a constant ratio.

40. After that point, the air inside the vial, which is the headspace, is sampled through the rubber septum (using an injection needle through the rubber septum); that sample of the headspace is placed inside the gas chromatograph.
41. Inside the gas chromatograph, the headspace sample travels through a roughly thirty-meter-long hollow tube referred to as a gas chromatography column or a capillary column; the headspace sample is pushed through the column by a "carrier gas."
42. Attached to the sides of the column is a substance that attracts substances in the headspace sample; as the headspace sample travels through the column, the substances in the headspace sample, such as ethyl alcohol and the standard solution, are attracted to and stick to the column walls.
43. The various substances in the headspace sample become unstuck from the column walls at different periods of time; those substances then continue to travel through the column.
44. The chromatograph, using a flame ionization detector, detects when the substances reach the end of the column; substances more attracted to the column walls reach the end of the column later.
45. Using, typically, six different samples with known alcohol concentrations, the chromatograph is able to create a ratio or "calibration curve" showing when certain amounts of ethyl alcohol reach the end of the column when compared to the standard solution.
46. A sample with an unknown alcohol concentration (such as the sample from Defendant) can then be compared, in terms of when the ethyl alcohol reaches the end of the column, with that established calibration curve.
47. This establishes the alcohol concentration of the unknown sample.
48. When the BCA tests samples, including the sample from Defendant, it tests each sample twice, using different gas chromatographs with different columns, and the BCA requires that the results be within three percent of each other.
49. When Mr. Yoch analyzed Defendant's urine sample on September 11, 2008, he obtained an alcohol concentration of 0.135; when Mr. Yoch analyzed Defendant's urine sample on September 12, 2008, he obtained an alcohol concentration of 0.1361.
50. It is generally accepted by the scientific community that, when the appropriate standards and procedures are followed, headspace gas chromatography accurately determines the concentration of alcohol in a urine sample.
51. The instrumentation and standard operating procedures used by the BCA in headspace gas chromatographic analysis are the appropriate standards and controls, and they were followed in this case.

Relationship Between the Concentration of Alcohol in Blood and in Urine

52. When alcohol is consumed, it enters a person's stomach and then enters the bloodstream.
53. Once in the bloodstream, the alcohol enters various tissues and fluids in the body based upon their water content; this process takes roughly 60 to 90 minutes; the completion of this process is referred to as "equilibrium"; this distinction is sometimes referred to as the "absorption phase" (i.e. pre-equilibrium) and the "post-absorptive phase" (i.e. post-equilibrium).
54. Because urine's water content is higher than blood's water content, a person's urine will typically have more alcohol in it than a person's blood would.

55. It is generally accepted in the scientific community that, on average, a person's urine has approximately 1.33 times more alcohol than the person's blood.¹
56. Pursuant to Minnesota Statute section 169A.03, subdivision 2, alcohol concentration of blood is reported as a number of grams per 100 milliliters of blood, while alcohol concentration of urine is reported as a number of grams per 67 milliliters of urine; this represents a statutory calculation treating a person with a certain "blood alcohol concentration" ("BAC") the same as a person with a "urine alcohol concentration" ("UAC") 1.5 times higher.²
57. On average, this statutory scheme benefits DWI suspects submitting urine samples.³
58. Assuming that a person had completely voided (i.e. had fully emptied his or her bladder the last time the person urinated), a subsequent sample of the person's urine would reveal a UAC that would (once adjusted for the 1.33 proportion) represent the average BAC the person had during the time period between urinating.⁴
59. Alcohol in a person's blood is continuously being removed by the metabolic process.
60. On average, a person will "burn off" alcohol in the bloodstream at a rate of 0.015 grams per 100 milliliters of blood per hour.
61. Alcohol in a person's urine, on the other hand, is not dissipated in any fashion; alcohol in a person's urine is only removed when the bladder is emptied.
62. If a person had not completely voided, as an example, a subsequent sample of the person's urine could show a UAC that, when compared to the BAC, was unexpectedly low or unexpectedly high.⁵

¹ To state it another way, assuming the same amount of blood or urine, it is generally accepted in the scientific community that, on average, a person with BAC of 0.08 would have a UAC of roughly 0.1064.

² As an example, 0.08 grams per 67 milliliters is equal to roughly 0.1194 grams per 100 milliliters.

³ For example, while it is generally accepted that a person with a BAC of 0.08 would, on average, have a UAC (per 100 milliliters) of 0.1064, Minnesota's "over the limit" law is not violated unless the person has a UAC (per 100 milliliters) of 0.1194.

⁴ To clarify by example, if a person fully voided, then drank increasingly during the next 60 minutes, the person's BAC would be rising during that time (the person's BAC would be higher at the end of the 60 minutes than it was at the beginning). A urine sample taken at the end of the 60 minutes would (once adjusted for the 1.33 proportion) have an alcohol concentration that, on average, would represent the average BAC during those 60 minutes.

⁵ This would depend upon the UAC of the urine that had remained in the bladder after the less-than-complete void. If the person, for example, had only just begun consuming alcohol, the urine already in the bladder would contain no alcohol and, therefore, would dilute the new urine being created. The result would be a lower-than-expected UAC when compared to the BAC. On the other hand, if the person had been drinking heavily but then stopped drinking, the urine already in the bladder would contain more alcohol than the new urine being created. The result would be a higher-than-expected UAC when compared to the BAC.

63. Likewise, if a person has not yet reached “equilibrium” (i.e. the person recently consumed alcohol that has not yet fully distributed throughout the body’s tissues and fluids), the UAC of a first-void sample would be unexpectedly low when compared to the BAC. See Alan Wayne Jones & Fredrik C. Kugelberg, Relationship Between Blood and Urine Alcohol Concentrations in Apprehended Drivers Who Claimed Consumption of Alcohol After Driving With and Without Supporting Evidence, 194 Forensic Sci. Int’l. 97, 98 (2010) (explaining “time-lag” resulting in lower-than-expected UAC/BAC ratio during absorption phase).
64. Likewise, if a person had reached “equilibrium” and stopped drinking, but did not urinate for a considerable time, the UAC of a first-void sample (again, representing an average BAC during the time period between urinating) could be unexpectedly high when compared to the BAC, due to the fact that alcohol “burns off” in blood but not urine.⁶
65. For these reasons, while it is generally accepted that, on average, a person’s urine would have approximately 1.33 times more alcohol than the person’s blood, in specific cases, the comparison between UAC and BAC can be different.⁷
66. There are situations in which a person’s UAC is more than 1.33 times higher than a person’s BAC.
67. For the same reasons, while it is less likely, there are situations in which a person’s UAC is more than 1.5 times higher than a person’s BAC.⁸

Relationship Between Alcohol Concentration of “First-Void” Urine and “Second-Void” Urine

68. A “first-void” urine sample, sometimes referred to as “the void”, “pooled urine”, or “random urine”, refers to the first urine sample given after a DWI suspect has been requested to submit to a test.

⁶ The Court makes no determination about what a “considerable time” would be, and the Court understands Dr. Stern’s contention that this is unlikely to be a factor.

⁷ The Court notes that Defense Counsel attempted to elicit testimony from Mr. Burr regarding “residual standard deviation”, which this Court did not allow due to an insufficient showing of foundation. The conceptual notion that an average may not be representative, however, is not in itself difficult. For example, the mathematical averages of two data sets (such as [0, 1, 99, 100] and [48, 49, 51, 52]) might be identical, though the mathematical average (without more data) may not be a fair representation of the data set. The State objected to Mr. Burr offering his opinion about what conclusion should be drawn from the “wide range” of possible UAC/BAC ratios, and the Court sustained that objection. The end analysis, however, does not require this Court to draw its own conclusion from the data, as explained in greater detail in the Memorandum attached to this Order.

⁸ Some hypothetical examples were testified to. Dr. Stern and the State contend that such scenarios are distinguishable from scenarios involving a driver suspected of being under the influence. The Court, however, does not draw its own conclusions regarding that.

69. If, after that first-void sample is given and the person has completely voided, and the person then waits a sufficient period of time so as to be physically able to provide another sample of urine, that second sample is a "second-void" sample.
70. One distinction between a first-void and second-void sample is that the amount of time between the first-void and the most recent prior voiding is unknown, while the time between the second-void and the most recent prior voiding (which would be the first-void) is known.
71. Therefore, inasmuch as a UAC can be representative of an average BAC over the period of time between urinating, the second-void UAC is representative of the average BAC over a specific known period of time, while the first-void UAC is representative of the average BAC over an unknown period of time.
72. A second distinction between a first-void and second-void sample is that it is unknown whether the most recent void before a first-void was a complete void, while (if the person is instructed to completely void for the first-void) it is known that the most recent void before the second-void was a complete void.
73. Therefore, inasmuch as the UAC of a sample may be unexpectedly low or high due to the UAC of any urine that was "leftover" from an incomplete void, using a second-void UAC would increase the likelihood of the UAC accurately representing the BAC.
74. A final distinction between a first-void and second-void sample is that some of the urine in a person's bladder before the first-void may have been created prior to "equilibrium" (during the absorption phase), while (assuming law enforcement personnel don't allow the subject to continue consuming alcohol) the urine created between the first-void and second-void would more likely be "equilibrium" (or post-absorptive phase) urine.
75. Therefore, inasmuch as the UAC of a sample may be unexpectedly low because the person was in the absorption phase, using a second-void UAC would increase the likelihood of the UAC accurately representing the BAC.⁹

Relationship Between Alcohol Concentration and Impairment

76. It is generally accepted in the scientific community that a BAC indicates a person's level of impairment from alcohol.¹⁰
77. It is generally accepted in the scientific community that there is a correlation between the amount of alcohol in a person's urine and the degree to which the person is impaired by alcohol. See generally Emil Bogen, The Diagnosis of Drunkenness—A Quantitative Study of Acute Alcoholic Intoxication, 26 Cal. & W. Med. 778 (1927).
78. Dr. Stern clarified that this correlation specifically suggests that a person who appears to be impaired will have a high concentration of alcohol in their urine; Dr. Stern, however, testified that the correlation would not allow him to conclude that a person should be impaired solely because they have a high concentration of alcohol in their urine.
79. Mr. Hardin testified that, in his opinion, urine testing is not an accurate means of assessing impairment; during his tenure as the Toxicology Supervisor of the BCA

⁹ In this fashion, using a second-void UAC could actually benefit the State rather than the driver.

¹⁰ Mr. Hardin and Mr. Burr testified, without contradiction, that it is generally accepted that if a person has a BAC of 0.08 or more, the person's driving-related skills are necessarily impaired by alcohol.

laboratory, Mr. Hardin unsuccessfully attempted to propose legislation to remove urine testing for alcohol concentration in Minnesota.

80. The Society of Forensic Toxicologists ("SOFT") is preeminent in the field; in the most recent of the SOFT guidelines, section 6.4.2 states, in part, "It must be emphasized that neither qualitative nor quantitative analysis of urine permits an evaluation of the effect of the drug or chemical on human behavior." SOFT/AAFS, Forensic Toxicology Laboratory Guidelines 8 (2006).
81. A UAC (without other evidence) indicates a person's impairment by alcohol only to the extent that the UAC accurately represents the person's BAC.

General Acceptance of First-Void Urinalysis for DWI Enforcement in the Scientific Community

82. Urinalysis for alcohol concentration has been used for over 100 years for forensic purposes.
83. Urinalysis for alcohol concentration has been used in relation to prosecution for DWI crimes for at least 70 to 75 years.
84. The vast majority of states in the United States do not use any urinalysis to determine alcohol concentration for the purposes of DWI enforcement.¹¹
85. Of the states in the United States that do use urinalysis to determine alcohol concentration for the purposes of DWI enforcement, every state other than Minnesota either requires a second-void sample or prefers a second-void sample.¹²
86. Minnesota is the only United States jurisdiction that uses urinalysis to determine alcohol concentration based solely upon a first-void sample.
87. Of the jurisdictions outside of the United States that enforce DWI laws, no evidence was presented that any use urinalysis to determine alcohol concentration based solely upon a first-void sample; evidence was presented showing that some European jurisdictions do not use first-void urinalysis.
88. The Court received many articles, by authors considered experts in the field of forensic toxicology, in which the authors reject the use of first-void urinalysis (either specifically or as part of a general rejection of urinalysis) for the purposes of DWI enforcement:
 - a. Sidney Kay & Eduardo Cardona, Errors of Converting a Urine Alcohol Value into a Blood Alcohol Level, 52 Am. J. Clinical Pathology 577, 577 (1969) (noting "wide ranges" in ratios between UAC and BAC in published reports, and concluding use of an average ratio is unreliable in "medico-legal cases").
 - b. U.S. Department of Transportation, National Highway Traffic Safety Administration, Alcohol in Relation to Highway Safety, in Highway Safety

¹¹ Dr. Stern testified that he believed 12 to 14 states "use urine in some fashion or another," though he was not aware whether, in practice, all of those states actually use urine testing. Mr. Burr testified that he was aware of only 11 states that allow urine testing by either statute or rule, and he believed that only four "actually used it in practice to any extent that makes any difference."

¹² Mr. Burr testified that, for example, in Iowa a second-void sample is preferred, but they can use a first-void if that is the only sample available.

- Program Manual IV-5—IV-6 (1975) (urinalysis to determine alcohol concentration discouraged; chemical tests of blood or breath preferred).
- c. N. G. Flanagan et al., Further Observations on the Validity of Urine Alcohol Levels in Road Traffic Offences, 17 *Med. Sci. Law* 269, 270 (1977) (noting general agreement of “little correlation between blood and urine levels” and recommending use of second sample taken within one hour of first).
 - d. Sidney Kaye, The Collection and Handling of the Blood Alcohol Specimen, 74 *Am. J. Clinical Pathologists* 743, 743 (1980) (using urinalysis to measure alcohol concentration “obviously is not proper” due to “wide possible error range”).
 - e. Charles L. Winek et al., The Unreliability of Using a Urine Ethanol Concentration to Predict a Blood Ethanol Concentration, 25 *Forensic Sci. Int’l.* 277, 279-80 (1984) (unless subject completely voids, waits, then provides sample for analysis, UAC could be higher or lower than “actual ethanol concentration”).
 - f. Kurt M. Dubowski, Absorption, Distribution and Elimination of Alcohol: Highway Safety Aspects, 10 *J. Stud. on Alcohol Suppl.* 98, 102 (1985) (BAC cannot be established for forensic purposes from “pooled” UAC).
 - g. Alfred A. Biasotti & Thomas E. Valentine, Blood alcohol Concentration Determined from Urine Samples as a Practical Equivalent or Alternative to Blood and Breath Alcohol Tests, 30 *J. Forensic Sci.* 194, 205-06 (1985) (second-void should be collected between 20 to 60 minutes after first-void).¹³
 - h. Alan W. Jones, Ethanol Distribution Ratios Between Urine and Capillary Blood in Controlled Experiments and in Apprehended Drinking Drivers, 37 *J. Forensic Sci.* 21, 31 (1992) (if bladder was not previously completely voided, sample may have unexpectedly high UAC compared to BAC due to “old” urine).
 - i. A.W. Jones, Reference Limits for Urine/Blood Ratios of Ethanol in Two Successive Voids from Drinking Drivers, 26 *J. Analytical Toxicology* 333, 333 (2002) (failure to completely void can skew ratio between UAC and BAC, even in second-void sample).
 - j. Alan W. Jones, Urine as a Biological Specimen for Forensic Analysis of Alcohol and Variability in the Urine-to-Blood Relationship, 25 *Toxicology Rev.* 15, 16-17 (2006) (ratio between UAC and BAC depends, in part, on length of time urine remains in bladder before voiding; urine testing only as reliable as breath testing for prosecution of drunk drivers if procedures, including collecting two samples one hour apart, are followed).
 - k. Alan Wayne Jones & Fredrik C. Kugelberg, Relationship Between Blood and Urine Alcohol Concentrations in Apprehended Drivers Who Claimed Consumption of Alcohol After Driving With and Without Supporting Evidence, 194 *Forensic Sci. Int’l.* 97, 97-98 (2009) (noting complicated interpretation of UAC to BAC ratio for random voids is “simplified” if two samples are taken roughly 60 minutes apart).
89. The Court received two articles supporting the use of first-void urinalysis in DWI prosecutions.

¹³ While the State, via Dr. Stern, noted that this article suggests the use of a 1.5:1 ratio like Minnesota uses, that recommendation was still made in the context of testing a second-void, not a first-void sample.

- a. A 1965 article recommended that legislation allow DWI prosecution based solely upon a specific UAC without calculation to a BAC, because "it is an unsatisfactory procedure to calculate the alcohol content of blood from a random specimen of urine." W.H.D. Morgan, Concentrations of Alcohol in Samples of Blood and Urine Taken at the Same Time, 5 J. Forensic Sci. Soc. 15, 20 (1965).
 - b. A 1967 article, commenting on Morgan's article, agreed that a BAC cannot be calculated from a single urine sample and recommended reporting a UAC and reporting that the UAC corresponds to "at least" a BAC of three-quarters that amount. Herman A. Heise, Concentrations of Alcohol in Samples of Blood and Urine Taken at the Same Time, 12 J. Forensic Sci. 454, 461 (1967).
 - c. Heise, however, stated he "prefers" the use of either two urine tests (10 minutes or more apart), or a single urine test with a roughly simultaneous test of either blood or breath. Id. at 460.
90. Dr. Stern explained his rationale for accepting first-void urine samples as follows:
- a. Alcohol has a "very powerful" and "universal" diuretic effect, which causes people who consume alcohol to urinate frequently;
 - b. Therefore, when a driver is stopped for suspicion of violating the DWI laws, the urine in that driver's bladder has been there a "relatively short time, probably between sixty and ninety minutes";
 - c. While it would be theoretically possible for a person to have urine containing alcohol in their bladder, such that their UAC would be above the legal limit while having a simultaneous BAC at or near zero, in the context of driver's stopped for suspicion of driving while impaired, "the probability is minute," and "so extreme that [Dr. Stern] can't even imagine it";
 - d. While Dr. Stern characterized this as a "nonexistent problem," he did agree that it would be obviated by using a second-void test;
 - e. While there are cases in which the person's UAC is more than 1.5 times the person's BAC (assuming the same amount of urine and blood), in Dr. Stern's opinion, those results are typically limited to cases in which a person's BAC is so relatively low that Minnesota's DWI laws would not be implicated.
91. In light of the dates of the articles and the comparative number of articles supporting each position, it is clear that the use of first-void urinalysis as a sole factor for DWI enforcement is not generally accepted in the scientific community.
92. The attached Memorandum is hereby incorporated into these Findings of Fact.

Based upon the above Findings of Fact, the Court makes the following:

CONCLUSIONS OF LAW

- I. It is generally accepted in the scientific community that headspace gas chromatographic analysis determines the UAC of a sample in a scientifically reliable manner.
- II. The BCA laboratory conducted the urinalysis in this case in compliance with appropriate standards and controls.


Based upon the above Findings of Fact and Conclusions of Law,

IT IS HEREBY ORDERED:

1. For the purposes of the Frye-Mack standard, the evidence of the alcohol concentration of Defendant's urine sample is deemed admissible, subject to any other appropriate evidentiary objection at trial.

Dated: April 23, 2010

BY THE COURT:


David W. Peterson
Judge of District Court

MEMORANDUM

I. Introduction.

Under Minnesota law, the admissibility of evidence obtained from scientific techniques is governed by the Frye-Mack standard. See State v. Roman Nose, 649 N.W.2d 815, 818-819 (Minn. 2002) (outlining Frye-Mack standard and Minnesota's continuing adherence to it). "[T]he Frye-Mack standard asks first whether experts in the field widely share the view that the results of scientific testing are scientifically reliable, and second whether the laboratory conducting the tests in the individual case complied with appropriate standards and controls." Id. at 819 (citing State v. Jobe, 486 N.W.2d 407, 419 (Minn. 1992)). Minnesota has continued to adhere to this standard despite the United States Supreme Court's deviation from it in Daubert v. Merrell Dow Pharmaceuticals, Inc., 509 U.S. 579, 588 (1993). See Goeb v. Theraldson, 615 N.W.2d 800, 812-14 (Minn. 2000). The "general acceptance" standard of the first Frye-Mack prong is preferred in Minnesota, because, while the Daubert approach confers upon judges the authority to determine what is scientific, the "general acceptance" standard ensures that scientists (being the most qualified to assess scientific validity) have the "determinative voice." State v.

Traylor, 656 N.W.2d 885, 891 (Minn. 2003) (quoting Goeb, 615 N.W.2d at 812-13). The second Frye-Mack prong, regarding foundational reliability, entails a two-part analysis demonstrating (1) what are the appropriate standards and controls, and (2) whether, in this case, administration of testing conformed to procedures. Traylor, 656 N.W.2d at 894-97 (Minn. 2003).

II. What is the Scope of the Issue?

Before the Court can address the two prongs of the Frye-Mack standard, the specific issue before the Court needs to be framed with clarity. The State contends that urine testing as done in Minnesota is generally accepted in the scientific community to accurately (1) demonstrate impairment by alcohol, and (2) determine whether the concentration of alcohol in the urine sample is 0.08 grams of alcohol per 67 milliliters or more. Defendant contends that first-void urine testing is not generally accepted in the scientific community for the enforcement of DWI laws. To frame in another way, there are, potentially, three questions before the Court:

1. Is it generally accepted in the scientific community that headspace gas chromatography (as performed by the BCA) accurately determines the amount of alcohol in a subject's first-void urine sample?
2. Is it generally accepted in the scientific community that a UAC obtained from such testing of a first-void urine sample accurately demonstrates a subject's BAC and/or impairment by alcohol?
3. Is the use of first-void urine testing generally accepted in the scientific community for DWI enforcement?

The Findings of Fact addressed all three of these issues. However, as a matter of law the Court concludes that only the first of these questions needs to be answered.

The Frye-Mack issue relates to what the evidence offered by the State (i.e. the UAC result) purports to show; not what conclusion is to be drawn from that evidence.¹⁴ See State v. Jones, 678 N.W.2d 1, 14-15 (Minn. 2004) (affirming trial court's conclusion that certain alleged errors regarding second Frye-Mack prong went to weight at trial). The Court understands and appreciates the arguments on both sides regarding the correlation between UAC, BAC, and impairment and whether the scientific community generally accepts the correlation. Even when couched in terms of general acceptance, however, to the extent that a first-void UAC may or may not be relevant to BAC or whether a person was "under the influence of alcohol" (which the Court need not decide), the Frye-Mack issue is not whether the evidence is good or even relevant to the charge. The issue is whether it is generally accepted in the scientific community that the evidence is what it purports to be.

In the context of a violation of the *per se* law of Minn. Stat. § 169A.20, Subd. 1(5), what that evidence purports to show is specifically how much alcohol was in Defendant's urine. That statute provides that it is a crime to drive, operate, or be in physical control of a motor vehicle when:

[...] the person's alcohol concentration at the time, or as measured within two hours of the time, of driving, operating, or being in physical control of the motor vehicle is 0.08 or more[...]

¹⁴ The State cites State v. Jensen, 482 N.W.2d 238 (Minn. Ct. App. 1992) review denied (Minn. May 15, 1992), for the proposition that issues regarding the conclusions to be drawn from the scientific evidence go to weight rather than admissibility. The appellate court in Jensen specifically did not apply the Frye-Mack standard, because the court did not consider the scientific principles at issue to be novel. Id. at 239. Further, the reference to weight rather than admissibility was a footnote explaining that certain variables unknown to the expert witness (Mr. Burr, in fact) "most likely" go to weight. Id. at 240 n.2. The concept behind the State's assertion, however, is persuasive.

Superficially, this suggests that the State offers the UAC result as evidence of Defendant's alcohol concentration, rather than as evidence of her urine alcohol concentration.¹⁵ Section 169A.03, Subd. 2(3), however, defines "alcohol concentration" to include, "the number of grams of alcohol per 67 milliliters of urine." Reading these statutes together, the crime is defined as driving, operating, or being in physical control with a UAC above a certain level (as measured within two hours). Therefore, the UAC result is offered solely as evidence of the amount of alcohol in Defendant's urine.

Even in the context of a violation of the "under the influence" law of Minn. Stat. § 169A.20, Subd. 1(1), the UAC still purports to be merely evidence of the amount of alcohol in Defendant's urine. The proffered evidence would, of course, be subject to a variety of possible objections.¹⁶ At trial, Defendant would have the opportunity to cross-examine the State's witnesses and present any witnesses on her behalf to address the weight that should be given to the UAC result in determining whether Defendant was under the influence of alcohol.

Regarding the final question, whether the use of first-void urine testing is generally accepted in the scientific community for DWI enforcement, the Court understands that the scientific community certainly appears to have opinions on that subject. While the Court's Findings of Fact address those concerns, this Court offers no opinion about them. "It is the

¹⁵ If this were the case, a whole host of other questions might be raised. A person does not have an alcohol concentration; the tissues and fluids in the person's body have an alcohol concentration. If "alcohol concentration" were not defined in Chapter 169A, the analysis may be different.

¹⁶ Whether, for instance, a 0.08 test result should be allowed as evidence on an "under the influence" charge is a matter for the trial court applying the rules of evidence in a particular factual context. The Court notes that, having been involved in hundreds of "dually charged" cases (i.e. Count I charging "under the influence" and Count II charging "0.08 or more") over the past 30 odd years, invariably the prosecutor focuses the test result exclusively on the 0.08 count and ignores the test on the "under the influence" count.

exclusive province of the legislature to define by statute what acts shall constitute a crime[...]" State v. Forsman, 260 N.W.2d 160, 164 (Minn. 1977); see also Minn. Stat. § 609.015, Subd. 1 (abolishing common law crimes).¹⁷ When section 169A.03, Subd. 2(3) is read in combination with section 169A.20, Subd. 1(5), it is clear that the crime is legislatively defined as driving with a certain amount of alcohol in a person's urine.

Based upon this analysis, the Court concludes that the issue before it is properly framed as whether the State has proved that it is generally accepted in the scientific community that headspace gas chromatography (as performed by the BCA) accurately determines the amount of alcohol in a subject's urine sample. The Court turns now to that analysis.

III. It is Generally Accepted in the Scientific Community that Headspace Gas Chromatographic Analysis Determines the UAC of a Sample in a Scientifically Reliable Manner.

The proponent of the scientific evidence has the burden of proving that it is generally accepted in the scientific community. Goeb, 615 N.W.2d at 814. While unanimity among scientists is not required, "general acceptance" means "widely" or "broadly" accepted in the field. State v. Fenney, 448 N.W.2d 54, 57-58 (Minn. 1989). The proponent of the scientific

¹⁷ The judiciary does have the power review a criminal statute to determine whether it violates an individual's constitutional rights. Forsman, 260 N.W.2d at 164. At the outset of the hearing, on the record the Court discussed with Counsel the "implicit" constitutional arguments, and the Court received Exhibits 10 and 11 for those purposes. Counsel's written argument focuses on the Frye-Mack issues, rather than any constitutional issues. Minnesota statutes are presumed constitutional, and the party challenging that presumption must demonstrate, beyond a reasonable doubt, that the statute violates a constitutional provision. State v. Barker, 705 N.W.2d 768, 771 (Minn. 2005). Based upon the record before it, and the lack of argument by Counsel, the Court makes no specific ruling on any constitutional issue except to find that Defendant did not meet the necessary burden.

evidence can meet this burden with various types of evidence pertaining to general acceptance, including, for example, expert witness testimony, appellate court decisions in other jurisdictions, and the practice of the BCA.¹⁸ Roman Nose, 649 N.W.2d at 820-21. Specifically when considering appellate decisions of other jurisdictions as evidence in this regard, consideration should be given to the legal standards employed in the jurisdiction and whether the decision was made after reviewing the record of an evidentiary hearing. Id. at 820. While the BCA's practice may be relevant evidence in assessing whether general acceptance has been shown, it is not dispositive. Id. at 821. The State also contends that general acceptance is shown in this case because (1) urinalysis for alcohol concentration has been admitted in Minnesota for decades, and (2) such evidence has been relied upon in appellate review. Even if the Court relies upon this as

¹⁸ The State cites State v. Moore, 458 N.W.2d 90, 98 n.6 (Minn. 1990) for the proposition that a court can take judicial notice of the general reliability of the scientific principles at issue. While the case arguably supports that proposition, it has little precedential or persuasive impact on the instant case. First, Moore's footnote reference to the taking of judicial notice of the general reliability of scientific principles is only a statement that other courts had done so. Id. This is far from an affirmative endorsement of the practice. Second, as the Court in Moore indicated, the defendant there had not requested a Frye-Mack hearing. Id. at 97. Arguably, then, the discussion of general acceptance in the scientific community is, at best, dicta. Finally, in light of the more recent case law, the use of judicial notice to establish general acceptance in the scientific community is, at best, dubious. See, Roman Nose, 649 N.W.2d at 822-23 n.9 (rejecting dissent's argument in favor of judicial notice). The concept of judicial notice applies to facts generally known or "capable of accurate and ready determination by resort to sources whose accuracy cannot reasonably be questioned." State v. Robinson, 718 N.W.2d 400, 406-07 (Minn. 2006) (quoting Minn. R. Evid. 201(b)). The very concept of judicial notice is inherently at odds with the concept of a Frye-Mack hearing as contemplated in current case law. See Traylor, 656 N.W.2d at 891 (scientists, not judges, determine what is scientific); Goeb, 615 N.W.2d at 812-13 (same).

evidence of general acceptance in the scientific community, it is only a part of the evidence in this case.¹⁹

In light of the Court's framing of the issue, the evidence before the Court leads to the conclusion that the State has clearly met its burden. The Court heard extensive testimony illustrating how headspace gas chromatographic analysis works, as outlined in the Findings of Fact. There appeared to be no dispute that proper headspace gas chromatographic analysis accurately determines how much alcohol is in the sample of urine that was tested. Dr. Stern testified that headspace gas chromatography is "without doubt" generally accepted in the scientific community, and he explained that the College of American Pathologists has a program in which, of roughly 235 laboratories that participate, about 77% use gas chromatography. Defendant's witnesses agreed. Mr. Hardin specifically testified that the gas chromatograph, when calibrated properly, provides an accurate, reliable measurement of the amount of alcohol in

¹⁹ Reliance upon this as "evidence" is, arguably, misplaced. The issue is whether the scientific community generally accepts the urinalysis the State wishes to admit, not the legal community.

At page 26 of its Memorandum, the State asserts, "The Minnesota Supreme Court has specifically held that this consistent judicial reliance on and citation to scientific evidence demonstrates its general acceptance," and cites Moore, 458 N.W.2d at 97. This Court has already addressed the State's reliance upon Moore. See supra note 12. Even if the State's reliance upon Moore was not misplaced, Moore's passing mention of other cases is not a holding.

In the next sentence, the State also claims, "Indeed, the general acceptance of many scientific techniques have been reviewed and confirmed by the Supreme Court in the same way, *including urine testing for alcohol concentration.*" (Emphasis in original.) The cases the State cites, however, do not support that assertion. See Strand v. Village of Watson, 72 N.W.2d 609, 613 (Minn. 1955) (Supreme Court's recitation of the facts included mention of urinalysis result, but there was no mention of general acceptance in the scientific community); State v. Hogdson, 512 N.W.2d 95, 98 (Minn. 1994) (Supreme Court allowed bite-mark testimony because it was not "a novel or emerging type of scientific evidence"); State v. Anderson, 379 N.W.2d 70, 79 (Minn. 1985) (holding that "graphological" handwriting analysis was properly excluded as unreliable).

a tested sample of either blood or urine. Mr. Burr specifically testified that the methodology used by the BCA to analyze the alcohol concentration of a biological sample is a sound scientific method and is accepted in the scientific community. The State has satisfied the “general acceptance” prong of Frye-Mack.

IV. The BCA Laboratory Conducted the Urinalysis in this Case in Compliance with Appropriate Standards and Controls.

The Court heard testimony about the urine collection kits, and received an unused kit into evidence. There was little dispute that the BCA’s procedures in this regard are generally accepted in the scientific community. Mr. Burr testified that he does not believe the procedures for collection, storage, and transportation of the urine sample are sufficient to ensure the reliability of a sample once it arrives at the BCA. The BCA, however, promulgates those procedures, which is some evidence that they are appropriate standards and controls. Dr. Stern explained the appropriate standards and controls. The parties stipulated that the jailor or dispatcher who collected the urine sample followed the procedures outlined in Rule 7502.0700. Mr. Yoch testified that he followed the protocols regarding the BCA’s intake of the sample and noticed no problems with it. The Court finds that the procedures regarding the collection, transportation, and acceptance of the sample at the BCA (1) are the appropriate standards and controls, and (2) were followed in this case.

There was no dispute that the BCA’s standard operating procedures regarding the use of the gas chromatograph are generally accepted in the scientific community. Mr. Burr specifically testified that the BCA’s standard operating procedure, such as using different capillary columns and testing the sample twice, are all “the current state of the science” and the BCA “uses the

most current recommended technology.” Mr. Burr further testified that the BCA’s analysis “will accurately analyze the alcohol concentration of that sample at the time they test.” Mr. Yoch testified that the BCA’s procedures were followed. The Court finds that the procedures regarding the use of the gas chromatograph (1) are the appropriate standards and controls, and (2) were followed in this case.

Defendant’s argument regarding the foundational reliability prong of the Frye-Mack analysis centers around Defendant’s assertion that first-void analysis is not generally accepted in the scientific community. As the Court has already concluded, the issue of general acceptance, in the context of this Frye-Mack hearing, is limited to the accuracy of the urinalysis itself. Likewise, in the foundational reliability context, the issue is whether the State has shown that the testing here conformed to procedures appropriate to determine how much alcohol was in Defendant’s urine sample. The State has satisfied the “foundational reliability” prong of Frye-Mack.

V. Conclusion.

The Court’s rationale can be summarized as follows. In the context of a Frye-Mack analysis, the results of the urinalysis in this case can only be admitted if the scientific community generally accepts that the analysis is reliable. The core issue, in this context, is whether the urine that was in fact tested was accurately tested in a manner accepted by the scientific community. The issue is not whether the scientific community thinks some other biological sample (e.g. blood, breath, or even second-void urine) should have been tested instead.

Defendant’s claim can be summed up by Mr. Burr’s testimony:

It’s my testimony that the scientific community of forensic toxicology does not support the use of urine for human performance toxicology. It is not supported in the forensic

science community, and I think that's very clear from all the literature and all the science that it is not supported, and urine testing in Minnesota is being used – DWI is a human performance toxicology test we heard, and so therefore it is not accepted in the scientific community.

(T. at 331-32.) While both sides addressed this contention at length, the Court is specifically not making any conclusion about the use of urinalysis for DWI enforcement, as that is beyond the scope of what the Court must decide. Whether it is appropriate, based upon what the scientific community has concluded, to criminalize a certain amount of alcohol in a person's urine is fundamentally a legislative question. The legislature has decided that question in the affirmative. It is the Court's function to apply the rules of evidence. Currently the statute defines the crime to specifically include having a certain amount of alcohol in a person's urine, as measured within two hours of the time of driving. The evidence before the Court establishes that the scientific community accepts the BCA's technique for determining how much alcohol is in a urine sample. Ultimately the jury must decide how much weight to give this evidence. As the guideline jury instruction says:

The State has introduced evidence of the testing method used and the results of the test that was administered to the defendant. You must evaluate the reliability of the testing method and the test results in determining whether the defendant's alcohol concentration was 0.08 or more within two hours of the time of driving.

10A Minnesota Practice CRIMJIG 29.12. The State has met its burden as required by the Frye-Mack standard.

Amy
4-23-10